RCEME TECHNICAL BULLETIN

Vol 5 No.1 1 Feb 60

RESTRICTED

DIRECTORATE OF ELECTRICAL AND MECHANICAL ENGINEERING

A RCEME PRAYER

O God of power and might, Whose all-pervading energy is the strength of nature and man; inspire, we pray Thee, we Thy servants of the corps of royal canadian electrical and mechanical engineers with the quickening spirit of goodwill, that as honest craftsmen, seeking only the good of all in peace or war, we may glorify Thee both in the work of our hands and the example of our fellowship, through Jesus Christ our Lord. Amen

RCEME TECHNICAL BULLETIN

(This prayer was written by the padre with a RCEME unit in France during the Second World War. It is recalled here as evoking concisely and simply the spirit in which the Corps approaches its services. It is recommended as a prayer for use at Corps occasions.)

Bulletin Distribution

The distribution of the Technical Bulletin has been increased beginning with this issue. This is being done so that more workshop personnel will see it and thus its value as a means of spreading technical information will be enhanced.

In addition to the senior officers who will continue to receive a copy, each workshop will be given a certain number of copies, depending on the number of personnel employed. These copies are intended to be circulated within the shop so that ALL ranks and civilians concerned will see them.

WHAT ABOUT THE ELECTRONIC BUSINESS?

Radar and fire control equipment have not provided much apparent activity for EME services in the last little while; the M33C is not giving the shops much business. Radar and fire control tradesmen may be wondering what the future holds for them; are they becoming redundant, like saddlers and farriers?

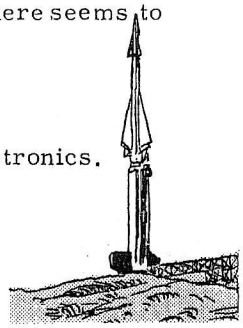
We will let you in on a secret. We think electronics is in the Army to stay. Guided missiles are full of electronics. These guided missiles need targets -- and target finding means more radar and drones. Then, whether you talk of 'zero ground pressure vehicles' or of 'aircraft' -- the Army is getting off the ground and will need all those electronic gadgets that let one move about in three dimensions in a thick fog in the middle of a moonless night. What about radiation surveillance? Will we depend only on the man walking about with a radiation survey meter -- or will we be able to sit back and read the information gathered by some sort of remote-controlled vehicle?

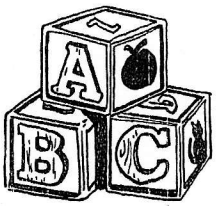
If you are concerned about the future in electronics there seems to be two courses open:

a. Become an expert in repairing bows and arrows or

b. Use any spare time to keep up with the latest in electronics.

We suggest the latter.





LEARNING NEVER STOPS

The capacity to learn is the most distinguishing fact about human nature. The first 15 to 20 years of a person's life are devoted largely to learning; to gaining ways of moving, perceiving, thinking, and feeling, necessary for the business of an adult human being.

The process of learning is a central feature of human life. Every act of manual skill displayed, every item of information possessed, every ideal and prejudice with which the day's events are met are the result of learning. No attempt to understand human nature can be successful unless the principles of learning or habit formation are taken into serious account. Man is never through learning.

--Alfred P. Sloan

MANAGEMENT ENGINEERING

WORK STUDY AND METHOD IMPROVEMENTS

"There is no operation in your workshop, nothing that you do now, that cannot be improved". Once this statement has been accepted, in work study and method improvement, the next step is to look around and select one operation for study.

We are all creatures of habit. This seems to be a condition that occurs at some point in the maturing process after which we cease to challenge the reason for many of our actions and become smug in the belief that our habits must be obeyed. As children we had everything to learn so we continually asked "why?"

When a new idea is advanced we do ask why we should accept it but this is because it will disturb a pattern of habit we have long since ceased to challenge. We should ask instead "why not?" to the new idea and then "why?" to the habit that will be disturbed.

In approaching a work study problem the first thing to ask is "WHAT is the operation supposed to accomplish?" Next, "WHY is the operation done at all?" Having established that the operation is necessary, we now observe "HOW it is done" and ask the question "HOW ELSE could it be done?" This should normally lead to several alternatives, even the most improbable of which should be examined for hidden benefits. At this stage both supervisors and tradesmen should be encouraged to make suggestions. This gives a feeling of participation and makes a change easier to install.

In order to standardize work study, the Corps has adopted, as a reference text, the book "Introduction to Work Study" published by the International Labour Office, Geneva. This book is used on courses at all levels at the RCEME School and is on general distribution down to workshop level. Officers and supervisors at all levels should be given access to it and be encouraged to use it.

With the recent establishment changes across Canada it becomes imperative that the effort put into work study and method improvement must increase. When an improved method is developed and proven in one workshop, send a complete report on it to DEME. If there appears to be a wider application for the new method it may be published in the RCEME Technical Bulletin so that the Corps as a whole may benefit.

LOYALTY TO ONE'S JUNIORS

Loyalty to one's superiors is easy - they pay our salary. What is more difficult but equally important is loyalty to one's juniors.

- V. Krishna Menon

VEHICLES

Two Cycle Engines
Detergent vs Non-Detergent Oils

Extensive tests have shown that the variations in wear between the detergent and non-detergent oil in the small two cycle engines is not sufficient to necessitate the supplying of non-detergent oil. It may be necessary to clean spark plugs more frequently when using the detergent oil.

After existing stocks of non-detergent oil have been used, 3-GP-345A or 365A will be issued in lieu.

Preservation of Engines

EME Manual Veh A 354, Item 54 of Table 1, details the procedure for preserving engines.

It is intended to amend this item by adding a note to sub-para c. as follows:-

Note: Steps one and two, if properly completed, are sufficient for protecting engines in long term storage under normal conditions. Step three is considered insurance to be used at the discretion of local EME authorities to meet abnormal conditions such as:

a. Extended preservation periods, eg, mobilization reserves,

b. Engine designs that do not accept normal preservation as well as others,

c. Unusual climatic conditions.

Pending issue of the amended instruction, copies held should be marked accordingly.

Ferret Scout Car, Inner Tractor Housing

It appears that some confusion exists in para 5, sub-para c. and d. of EME Manual Veh N 027, Instr 28.

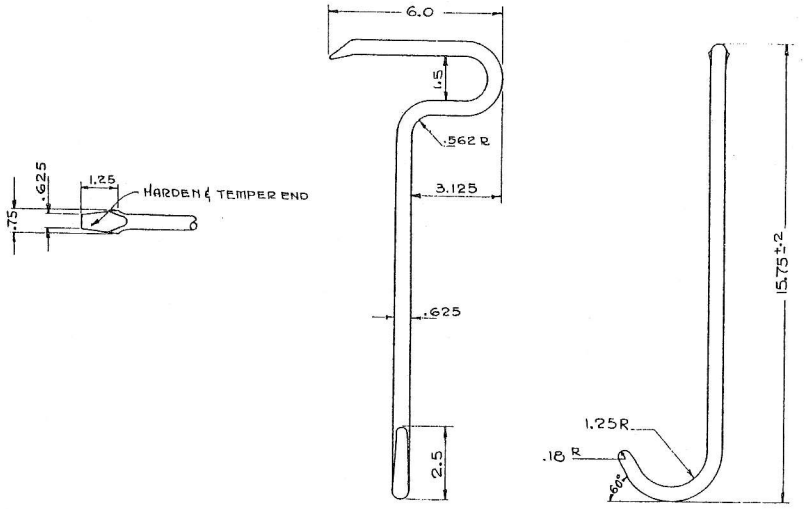
Reassembly without the gaiter (sub-para c.) is to ensure proper measuring of the clearance required. The reassembly called for in sub-para d., includes the replacement of the gaiter.

Tool, Recovery Mechanics
DEME Dwg, No. 89205

The tool detailed below has been developed to facilitate the handling of heavy winch rope, tow ropes, and tackle, used on recovery vehicles.

This tool is intended to minimize the possibility of recovery mechanics injuring their hands or damaging the equipment.

When authority is arranged (amendment to EIS) these tools may be manufactured locally on the scale of 3 per ARV and 2 for other recovery vehicles, to be carried on the EIS.



Spark Plug Maintenance

A general issue has been made of TM9-8638 "Spark Plugs used on Ordnance Material".

This manual covers cleaning, testing and assessing spark plugs for serviceability and should be made available to all automotive personnel for study.

Special attention should be given to para 23, 24, and 25 which cover cleaning, gapping, and testing. There are misconceptions of these three subjects which can be corrected by using this manual.

Additional copies of the manual are available on indent through RCOC.

INSTRUMENTS

Open Collimator and Chart

Investigation is under way to produce an adapter and a wall chart for the 4-in, 10 ft focal length lens. This equipment will simplify the testing of certain US and CDN optical instruments.

Sight, Periscopic, AFV, No. 1

A field and base repair instruction is being prepared. Workshop entitlements will be amended to include the special tools and test equipment required.

SMALL ARMS

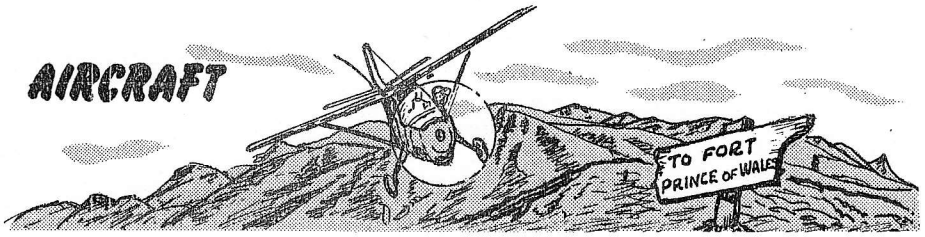
Rifle, 7.62 mm, FN (C1)

A modification instruction will be issued shortly introducing a new lever locking catch, which will prevent accidental opening of the rifle. The main difference is that the arm of the lever is shorter.

An instance has been reported of a firing pin breaking and jamming forward in the breech block. Initially this fault will cause a feed stoppage. If normal "IA" is applied, the breech block will then feed the round into the chamber and is likely to fire the round before the action is locked. Immediately a feed stoppage occurs, the breech block should be withdrawn to the rear and held by the holding open device while the jammed round is removed and the face of the breech block examined for a broken firing pin jammed forward into the breech block. It is requested that all broken firing pins be the subject of an Equipment Failure Report.

Gun Submachine 9 mm, (C1)

The new submachine gun will soon be on general issue. EME Manual instructions are being written.



1 RCHA Air Op troop arrived in Europe in January to give greater flexibility and support to 4 CIBG. Their aircraft (Cessna L19) will be operated and maintained by Canadian army personnel. This marks the beginning of a new era for the army in which aircraft are solely an army responsibility; prior to the formation of this all-army unit the maintenance and repairs have always been an air force responsibility. The demand for mobility for a modern army has once again placed a new responsibility on RCEME.

The program of training to prepare for this role was initiated in 1955. Personnel were methodically selected to undergo training with the US army followed by an in-job training program with the RCAF. Upgrading in the respective trades was by RCAF trade tests. To date numerous personnel have either received or are receiving this training.

RCEME's first task started with the dismantling of the aircraft at Moncton, NB, for overseas shipment by commercial air. The tradesmen were then flown across the Atlantic by Comet to meet the arriving aircraft at Dusseldorf, Germany. The second task was to assemble the aircraft for testing by the army test pilots. The aircraft were then flown to Fort Prince of Wales, Deilinghofen, Germany, the location of the Air Op troop.

The RCEME element is responsible for the servicing, unit and field repairs of the aircraft. Since the aircraft are operated from an aerodrome the unit and field repairs will be done by the same tradesmen at the one location. This procedure is a deviation from the normal RCEME repair system.

As the army air program builds up, a centrally located field workshop will be formed to perform all field repairs to both fixed and rotary winged aircraft. RCEME will then revert to its normal repair system.

The unit includes the following RCEME personnel:

WO 2	Mahood	NEH	AC Art	Cfn	Dewson	DR	Air Techn
Cpl	Kennedy	HA	Air Techn	Cpl	Barker	RA	Air Elec Techn
Cpl	Stewart	KC	Air Techn	Cpl	Rosamond	PC	Air Inst Techn
Cpl	Arnold	RB	Air Techn	Cpl	Muckersie	JW	Radio Techn
Cfn	Davis	OH	Air Techn	Cfn	Heldman	NC	Wdr

WORKSHOP

"The Nation's business is your business. You can help to keep it efficient. We want your ideas on how to cut costs or improve service and we will pay for them". The Minister of Finance recently issued this statement to Government employees and members of the Armed Forces to promote more active participation in the suggestion award plan.

During the fiscal year 58/59 a total of 202 suggestions submitted by the Department of National Defence were adopted. These suggestions resulted in the awarding of $13,671.49 by the Government to the originators of the suggestions and a total savings effected of $518,033.12.

The spirit of advancement of the Corps of RCEME is stimulated by the introduction of new ideas which will lead to the saving of time, material, and labour, or in the introduction of better working conditions. Such changes brought about by ideas submitted from within the Corps do much to increase the overall efficiency of RCEME.

A very good example of the value of a fairly simple idea is the suggestion by S sgt J M Ronan of 202 Base Workshop for the use of an inexpensive electrical metering device to detect spontaneous heating in piles of combustible stores. This device has been adopted for use at 25 COD, RCOC, Montreal.

Another suggestion that has recently been adopted is that of a safer, more practical, economical method of calibrating radiation detection equipment, submitted by Capt AM Gilbert, CD, DEME. The Gilbert Calibrator has already been adopted by the Canadian Army and is being considered by the other two Services and the United States and United Kingdom.

Both Capt Gilbert and S sgt Ronan have received cash awards for their suggestions. They are to be congratulated on their fine efforts. Their success in winning awards should encourage the submission of suggestions by other RCEME personnel.

While suggestions are to be encouraged vigorously from both civilian and military personnel, workshop and reviewing officers must ensure that the following principles are kept in mind in preparation of submissions:

a. The suggestion is a practical idea for improving operations or effecting economies in the armed forces or other government departments.

b. A person whose normal duties include making suggestions on specific subjects is not eligible for awards for such suggestions.

c. Suggestions concerning the improvement of an equipment should also be the subject of an Equipment Failure Report (EFR). The EFR should include a note that the suggestion has been submitted.

d. The reporting of errors in manuals or defects in equipment should not normally be the subject for a suggestion award. The normal procedure should be followed for reporting such instances.

As taxpayers we should all be interested in reducing costs if, at the same time, we can improve our service to our user units. With this thought in mind, it is hoped that there will be increased activity in the submission of suggestions from Corps personnel.

TECHNICAL SERVICES

Local Pattern Necessities

The increasing tendency to turn over stones and peer into cupboards during inspections of unit holdings, uncovered the fact that workshops held divers local pattern items which are essential to their operations but were not authorized. To regularize these holdings, entitlements to most of them have been approved. (See HQ 6063-2/10 TD 8309 (DCER 1B) dated 18 Sep 59 and HQ 6062-2/1 TD 9184 (DCER 1B) dated 6 Nov 59).

In preparing requests for these new entitlements an attempt was made to cover the holdings of all workshops in as general a fashion as possible; for example, the 'as required' entitlement to stands, workshop, local pattern, includes stands for ovens, collimators, lathes, test sets, carboys, tanks, bench drills and any other purpose for which such stands are needed.

It is emphasized that the new entitlements were approved on the basis that most of the equipment was already held. Manufacture or procurement of new equipment under these entitlements must be limited to necessities; abuse can only lead to severe limitations on any new entitlements of this type.

Although many of the probable local pattern holdings common to all workshops were considered, for obvious reasons it is not possible to cover everything from this HQ. Entitlement to other items of this nature may be needed and requests for further entitlements should be made before disposal action is ordered.

who's where

LOCATION OF RCEME WARRANT OFFICERS

Class 1

Anscomb	GW	5 Coy RCEME
Baynes	CH	1 Fd Wksp
Beddows	RS	The RCEME School
Boshier	R	8 Coy RCEME
Brennan	RS	The RCEME School
Brown	AT	18 Coy RCEME
Brown	JD	202 Base Wksp
Buck	WM	14 Coy RCEME
Churchill	CA	ADE
Clarke	DL	4 Fd Wksp
Conway	RF	2 Fd Wksp
Coupland	GE	202 Base Wksp
Cozens	SD	The RCEME School
Dillon	TF	ADE
Dodds	TH	The RCEME School
Dudley	J	Br of AG (D Org)
Fernets	JM	202 Base Wksp
Fox	HR	DEME
Gallier	H	The RCEME School
Gladwin	CH	COA I Staff
Gray	P	DEME
Greenham	IL	6 Coy RCEME
Guilfoyle	ME	LdSH (RC) LAD
Hayes	JW	DEME
Henry	JE	1 FGH LAD
Houlton	VH	DEME
Hunder	BAJ	The RCEME School
James	JW	RCAC School
James	LG	12 Coy RCEME
Kaufman	DC	202 Base Wksp
Keech	HL	DEME
Knight	RA	Que Comd HQ I Staff
Langford	WH	13 Coy RCEME
Lawson	RW	10 Coy RCEME
Leach	FH	AHQ C&D Estb
Leon	BU	16 Coy RCEME
Leonard	WV	14 Coy RCEME
Lewis	SM	1/8 Cdn H LAD
Lowry	LH	DCER
MacDonald	DJ	16 Coy RCEME
MacDonald	J	The RCEME School
McCague	LT	204 Base Wksp
McDonald	DB	The RCEME School
Mercer	JL	1 LAA Regt LAD
Neil	T	11 Coy RCEME
Norbury	G	56 Cdn Inf Wksp
Owen	LR	7 Coy RCEME
Patterson	DJ	CADEE
Richardson	W	202 Base Wksp
Rivers	AM	3 Coy RCEME
Riley	GA	DEME
Robertson	WG	DEME
Rowe	AW	The RCEME School
Shaw	JE	3 Fd Wksp
Sherman	CG	DEME
Sinclair	L	DEME
Sloan	H	4 Coy RCEME
Snell	JD	ADE
Tatham	J	11 Coy RCEME
Thivierge	AJ	ADE
Turner	CM	ADE
Turner	K	ADE
Walsh	IS	204 Base Wksp

Class 1

Walsh	DC	2 Coy RCEME
Weston	ET	RCD LAD
Young	RD	6 Coy RCEME

Class 2

Adams	RMJ	204 Base Wksp
Allen	EB	4 CIBG LAD
Ambler	J	2 Fd Wksp
Anderson	JS	202 Base Wksp
Anderson	SB	1 Fd Wksp
Armstrong	JH	The RCEME School
Axford	DS	56 Cdn Inf Wksp
Bailey	E	204 Base Wksp
Balmer	AJ	16 Coy RCEME
Barrett	S	2 Coy RCEME
Boisvert	L	5 Coy RCEME
Both	TA	6 Coy RCEME
Bottle	DA	2 CIBG LAD
Bougie	I	202 Base Wksp
Brooks	LF	204 Base Wksp
Broomer	TF	4 Coy RCEME
Brunton	AC	2 CIBG LAD
Burgess	EW	3 CIBG LAD
Burnett	JH	DEME
Byer	DE	7 Coy RCEME
Campbell	DN	56 Cdn Inf Wksp
Cassidy	GP	The RCEME School
Champagne	DJ	202 Base Wksp
Chapman	R	204 Base Wksp
Chisholm	LF	204 Base Wksp
Christensen	AJ	202 Base Wksp
Clarke	DC	13 Coy RCEME
Clyde	KT	204 Base Wksp
Cochrane	HM	3 Coy RCEME
Coles	JC	DEME
Colson	AR	3 Coy RCEME
Coughlin	AF	202 Base Wksp
Crane	CE	The RCEME School
Cross	FT	204 Base Wksp
Cunningham	JM	2 Fd Wksp
Dainty	HW	8 Coy RCEME
Dance	GN	10 Coy RCEME
Dand	RJM	13 Coy RCEME
Davis	FAE	11 Coy RCEME
Deans	AG	4 Fd Wksp
Dew	AE	10 Coy RCEME
Dewar	J	DEME
Doherty	E	202 Base Wksp
Doherty	SF	5 Coy RCEME
Dorey	EE	RCD LAD
Dormer	NH	3 Fd Wksp
Drake	EA	6 Coy RCEME
Drew	CV	ADE
Drobot	W	204 Base Wksp
Duncan	FP	1 CIBG LAD
Elliott	JR	10 Coy RCEME
Elliott	WEC	1 RCHA LAD
Evans	RL	56 Cdn Inf Wksp
Ewert	CD	3 CIBG LAD
Fairbairn	TM	10 Coy RCEME
Feller	DH	4 Coy RCEME
Ferguson	HG	4 CIBG LAD

Foley	HEF	3 RCHA LAD
Ford	RC	1 CIBG LAD
Ford	RLC	14 Coy RCEME
Fryer	JWA	3 Fd Wksp
Geitzler	LW	6 Coy RCEME
George	AG	4 Coy RCEME
George	LJ	LdSH(RC) LAD
Gibbs	BF	3 Fd Wksp
Gill	DE	DEME
Given	RJ	202 Base Wksp
Goss	RB	COA I Staff
Graham	AA	10 Coy RCEME
Graham	JC	3 Coy RCEME
Gribble	DL	1 LAA Regt LAD
Griffin	GW	3 Coy RCEME
Gunn	WH	11 Coy RCEME
Halliday	AG	202 Base Wksp
Hammond	GT	ADE
Hanash	J	10 Coy RCEME
Hardy	JR	3 Fd Wksp
Harper	JM	3 Coy RCEME
Harvey	LM	C&D Estb CAS(W)
Hawton	HW	204 Base Wksp
Healy	TW	202 Base Wksp
Henderson	KW	D Pers
Hewison	RW	3 Fd Wksp
Hicks	AL	6 Coy RCEME
Hinton	WG	The RCEME School
Hirsch	AL	8 Coy RCEME
Hooper	TC	10 Coy RCEME
Hurd	LR	DEME
Hutley	HA	14 Coy RCEME
Isaac	AW	5 Coy RCEME
Jackson	AF	C&D Estb AHQ
Jackson	O	The RCEME School
Janssen	MEJ	2 RCHA LAD
Johnson	GM	3 CIBG LAD
Johnson	WA	7 Coy RCEME
Johnstone	T	204 Base Wksp
Joyner	EF	CADEE
Kayne	HG	Incr 'C' Fd Wksp
Kelly	MP	12 Coy RCEME
Kelly	HA	ADE
Keogan	MJ	1 Fd Wksp
Kirkpatrick	AM	13 Coy RCEME
Knox	CD	202 Base Wksp
Kraemer	KE	The RCEME School
Lasuta	W	1/8 Cdn H LAD
Lauret	JE	4 Fd Wksp
Lawrence	BJ	12 Coy RCEME
Lee	KA	The RCEME School
Lee	WE	HQ RCEME Que Comd
Legg	FG	2 Fd Wksp
Leon	GR	1 Fd Wksp
Lewis	CB	11 Coy RCEME
Little	JE	202 Base Wksp
Longley	GM	4 Fd Wksp
Low	GA	202 Base Wksp
Macklaine	WB	1 Fd Wksp
MacLellan	EB	202 Base Wksp
MacLeod	D	DEME
MacPhee	DM	4 Coy RCEME
Maguire	GK	DEME
Mahood	NEH	The RCEME School
Main	T	HQ RCEME Pracom
Mallett	JG	202 Base Wksp
Marston	CV	HQ RCEME Wescom
Mason	J	2 Fd Wksp
Maw	A	204 Base Wksp
Maxwell	AC	18 Coy RCEME
McBlane	AG	Alta Area I Staff
McCaffrey	LE	2 Fd Wksp
McDonell	AT	4 Fd Wksp
McDow	KA	2 CIBG LAD
McElroy	JC	3 Fd Wksp
McGovern	PMJ	DEME
McInnes	DM	10 Coy RCEME
McIntyre	WA	2 Fd Wksp
McLeod	HAT	The RCEME School
McLeod	LF	HQ RCEME Eascom
McLeod	MH	DEME
McMurchy	WS	202 Base Wksp
Meloche	JR	4 Coy RCEME
Melvin	GR	1 Fd Wksp
Miles	CW	The RCEME School
Milne	HC	4 CIBG LAD
Moore	WE	10 Coy RCEME
Myatt	WC	4 Fd Wksp
Myrtle	PG	2 Coy RCEME
Nelson	EC	4 Coy RCEME
Nicholson	A	10 Coy RCEME
Oakes	GAM	202 Base Wksp
O'Grady	CL	4 Fd Wksp
Parker	JC	204 Base Wksp
Patterson	MP	204 Base Wksp
Peacock	GG	DEME
Pennie	FM	11 Coy RCEME
Perrin	WG	The RCEME School
Pineo	MC	11 Coy RCEME
Press	J	CADEE
Price	EC	DEME
Proud	VS	204 Base Wksp
Rawling	GW	DEME
Reid	J	DEME
Reimer	JJ	13 Coy RCEME
Renaud	JOP	8 Coy RCEME
Reynolds	GA	4 Coy RCEME
Rhodes	AP	204 Base Wksp
Robertson	DW	204 Base Wksp
Roche	WD	202 Base Wksp
Rocheford	EA	202 Base Wksp
Rodd	FL	DEME
Rose	AG	4 RCHA LAD
Roy	PRG	1 Coy RCEME
Russell	MM	13 Coy RCEME
Rutherford	FA	13 Coy RCEME
Sambrook	JV	DEME
Schleihauf	GH	202 Base Wksp
Sedger	CA	11 Coy RCEME
Seeley	HR	HQ RCEME Cencom
Seguin	RH	DEME
Silzer	J	7 Coy RCEME
Simpson	WG	2 Coy RCEME
Smith	DBR	The RCEME School
Smith	GE	3 Coy RCEME
Smith	GW	1 Fd Wksp
Smith	J	202 Base Wksp
Smith	LWC	DEME
Smyth	WC	204 Base Wksp
Spachman	JH	DEME
St Pierre	G	The RCEME School
Stever	JD	202 Base Wksp
Stewart	RH	204 Base Wksp
Stirton	J	204 Base Wksp

Storbo	RM	11 Coy RCEME	Upthegrove	WOR	2 Coy RCEME
Streeter	WE	202 Base Wksp	Walker	RL	7 Coy RCEME
Stringer	AJ	Man Area "I" Staff	Warminton	JW	3 Coy RCEME
Szumlanski	J	1 FGH LAD	Wasney	J	202 Base Wksp
Taylor	JF	12 Coy RCEME	Watt	JB	11 Coy RCEME
Taylor	HE	2 RCHA LAD	Weaver	CR	1 Fd Wksp
Taylor	RT	The RCEME School	Wilkinson	EJ	202 Base Wksp
Thomas	GA	C&D Estb CAS(W)	Wilson	RR	1 CIBG LAD
Thompson	JT	14 Coy RCEME	Wright	EO	The RCEME School
Toms	FA	202 Base Wksp	Young	RJ	16 Coy RCEME

HAVE YOU GOT THE "GIFT OF GAB?"

Talking comes as naturally as breathing to many people, yet it is a skill that everyone can improve by applying certain principles. According to one estimate, the typical manager spends over 40 per cent of his time talking -- so how well he talks is an important factor in his over-all effectiveness on the job.

Here are some guides to improving this vital skill:

Organize what you say. Probably the most common cause of a breakdown in face-to-face communicating is a failure to give orderly structure to what you are saying. Words flow so easily that it's often difficult to keep them organized. Whether you are expressing facts, opinions, or ideas, keep the sequence logical. Start with the simple and build to the complex. Connect the links with logical transitions.

"Custom-make" your communications. Talk that hits the target with one listener may put another to sleep. Tailor what you say to the person you're talking to — and always give him credit for being a bit smarter than you might think he is.

Don't be afraid of repetition. First state your point, then give your reasons for it. Give an example. Finally, summarize your point, using different wording.

Put life in your voice. Vary your volume and your inflection. If you want to stir up interest, be enthusiastic yourself.

Qualify your opinions. Say "To me," or "I think" before giving an opinion. Stating opinions as facts is one of the most irritating habits of conversation.

Try to get your listener to contribute. As you're talking, ask yourself what positive things your listener can contribute and try to guide the conversation to bring them out.

Share the time. If you monopolize the conversation, it's not a conversation, it's a monologue, and you'll soon lose your listener.

- Condensed from FACTORY